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AUTHOR D'Annunzio, Anthony; Steg, Doreen E.
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ABSTRACT

The effects of certain procedures as part of the curriculum in early childhood on the perceptual readiness of children exposed to it are explored. The procedures include: (1) the testing of each child to determine perceptual strengths and weaknesses; (2) the development of "learning print" for each child: a description of integrities and deficits for learning; (3) the listing of individual prescriptive procedures and techniques; and (4) the implication of an instructional program which emphasizes "corrective teaching." To determine the efficacy of this approach, two nursery school populations were involved in an experiment, one receiving a more or less conventional approach to early instructional intervention, while the other received a program stressing diagnosis, prescriptive findings, and concomitant procedures. The findings of the study indicate that the early intervention instructional program, when followed by prescriptive procedures and techniques, is superior to the type of reading readiness instruction offered by a representative nursery school. (Author/DB)

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# HELPING PROBLEM LEARNERS DURING THE EARLY CHILDHOOD YEARS

Anthony D'Annunzio, Ed.D.
Drexel University

Doreen E. Steg, Ph.D.
Drexel University



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## INTRODUCTION

As, of late, "teaching machines" have been put to use in "normal" and "abnormal" teaching situations, and a wealth of opinionated data had been published on the subject of the learning process. Many have maintained that the impact of "educational technology" has been clearly demonstrated.

It thus seems appropriate to distinguish between training and education.

Training involves the learning of some specific pattern of behavior, be it equilibrium on a tight rope or chess playing, etc., while education concerns the development of new, not previously learned behavior.

Thus, in every field of human endeavour, education would lead to accomplishments beyond the learned patterns. The result of education is creativity, while the result of training is performance involving skill and not necessarily creativity.

What brings into focus this difference, could be illustrated by the example of a trained "specialist" able to make a copy of a Vermeer which is hard to distinguish from the original. Whether it is in the field of painting or literature, or music, a masterwork can be recognized by the individual master's style. A work by Rubens, Borodin, or Hemingway is traceable to the author by the average layman, provided he had some basic training in the particular field. The training involved would be a training to paint, compose music or write literary composition. While this kind of

training is predicated on the assimilation of some previous experience. Creative activity goes beyond previous experience. Education implies going beyond previous experience while assimilation of previous experience is the expected result of training.

It is particularly in the area of training for the acquisition of skills leading to reading that the "talking typewriter" is making a most crucial contribution, significantly for educationally deprived children.

The training program is available on a voluntary basis to all children for up to 20 minutes a day as part of an educational day care program from 7:30 A.M. to 5:30 P.M.

## INTRODUCTION

Early intervention instructional programs, especially for educationally disadvantaged youngsters, are receiving considerable attention in the general literature in education. Federal, state, and local agencies have become increasingly concerned with providing effective tutorial services for children between three and six years of age. A wide spectrum of programs have developed out of this concern. In general, however, they have tended to follow three major learning schemes, each of which will be briefly described.

One such approach focuses upon the intensification of those experiences normally encountered by three, four and five year olds: group transactions, story telling, trips, informal learning sessions, etc. Unfortunately there is some doubt that the majority of disadvantaged children profit to an appreciable degree from such exposure. Initially these youngsters appear to make rapid advances in vocabulary development and other appraisals of "cognitive development." These gains, however, are frequently lost following the remedial program or when encountering learning situations in the first grade. A number of investigators of this phenomena reasoned that this may be due to the lack of change in behaviors basic to academic achievement (Sabatino and Hayden, 1970). If modification of basic behaviors occurred such as improvement in auditory and visual perception, then these changes should have become permanent although the specific remediation had subsided.

Another approach appears to take into consideration the modification of behaviors basic to learning by developing a number of specific instructional techniques and strategies, basing the early learning experiences of the child in total body and sensory development (Montessori, 1936; Kephart, 1960; Getman, 1962). This strategy has been used with great success, with such

limited populations as organically impaired children (Cruickshank, et. al. 1961), but is too slow, cumbersome, and expensive to be of more general use.

A third design, receiving substantial emphasis today, takes the "shotgun" approach as a learning model (Falik, 1969). This effort also attempts to get at behaviors basic to learning but focuses upon "getting children ready" by wholesale programs of visual and/or auditory perceptual training as part of the curriculum for every child (i.e. Frostig and Horne, 1964). An implication of this conceptual framework is that since many disadvantaged children have perceptual deficiencies, then readiness formats which stress its development should be beneficial for all such learners. But this view neglects the fact that perceptual inadequacies exhibit considerable variation with regard to type and extent. As examples, type may include visual and/or auditory, while extent may encompass a whole spectrum of, say, auditory perceptual inadequacies: reception, association, expression, closure, sound blending, sequential memory, etc.

The concern of the present study is to provide a learning model that avoids some of the pitfalls discussed above. The basic assumption underlying this learning scheme is the belief that previous efforts at remediating early childhood deficiencies to learning seldom focused on the modification of behaviors basic to academic achievement (i.e. perception) and, that when such attempts were made, they included only limited populations with severe deficiencies, or the learning designs were too amorphous, tending to neglect the specificity of learner inadequacies.

This study is an attempt to explore the effects of certain procedures, as part of the curriculum in early childhood, on the perceptual readiness of children exposed to it. These experiences include:

1. The testing of each child to determine perceptual strengths and weaknesses.
2. The development of "learning print" for each child: a description of integrities and deficits for learning.
3. The listing of individual prescriptive procedures and techniques.
4. The implimentation of an instructional program which emphasises "corrective teaching": teaching that takes into account each youngster's deficits and integrities to learning together with an indication of what specific deficiency or cluster of deficiences to remediate first

PROBLEM

In order to determine the efficacy of this approach to educational intervention in early childhood, two nursery school populations were involved in an experiment, one receiving a more or less conventional approach to early instructional intervention, while the other received a program stressing diagnosis, prescriptive findings, and concomitant procedures.

The general purpose of this study was to determine whether any significant improvement occurred in certain visual and auditory perception abilities of children when they were subject to a specific type of instructional treatment. Specifically, the primary purpose of this study was to compare the effects of a type of instruction, designed to develop visual and auditory perceptual abilities, with the effects of a more generalized type of perceptual instruction, similar to the shotgun approach discussed above.

RELATED LITERATURE

There is widespread interest in the role of perception in the reading process. It has long been recognized that deficiencies in auditory and visual percep-

tion have a negative effect on later reading development. Chall, et. al. (1963) observed that auditory blending ability was related to future ability in oral and silent reading. Murphy (1966) noted that the early teaching of a speech-based phonics program resulted in significantly higher achievement in reading and spelling. In an article by Mortenson (1968), he cites three reading researchers (Dunell, Deutch, Chall) who indicated the close relationship existing between visual and auditory discrimination abilities at the "prereading" level and eventual reading success. Auditory memory may likewise be an important skill in the early primary grades according to Rice and Doughtil (1970). Two investigators (Eakin and Douglas, 1971), in a review of the literature, noted that children with reading disabilities had the greatest difficulty with certain aspects of auditory language and that they did least well on tasks involving the "automatic-sequential" level of auditory language. In another study Holloway (1971) concluded that auditory perception deficits were a prime feature in "language-delayed" children. Numerous investigators, cited by Mortenson (1968), concluded that a very close, if not critical, relationship exists between visual discrimination abilities at the prereading level and later success in reading. Visual perception, as defined by Frostig (1969), develops maximally between the ages of three and seven years. Shea (1968) following a discussion of readiness to read, concluded that lack of capability to discriminate visually is a significant factor in limiting reading success.

Most of the youngsters comprising the population of the present study may be considered educationally deprived. Such children have a strong predisposition to develop perceptual and, later, reading difficulties (Bruininks, 1970; Lowry, 1970). Strauss and Lehtinen (1960) stated that with children who have impediments to learning, "waiting until they are in school" can

be particularly disadvantageous. There is evidence to suggest that this "waiting" often leaves the development of perception and other cognitive skills to chance environmental factors (Clarke and Clarke, 1959; Ginsburg and Opper, 1969). Particularly with educationally deprived children remedial procedures should be initiated as soon as the specific learning deficit is known, not waiting for some rather arbitrary developmental milestone, such as "school age."

Many investigators would agree that a shotgun approach, utilizing all of the senses simultaneously, is inefficient and, sometimes, harmful (Johnson and Myklebust, 1967; Falik, 1969; Bruininks, 1970; Lowry, 1970). There has been some controversy as to whether to utilize a child's assets to learning, disregarding or circumscribing his deficits, or train his deficits, paying little attention to his assets (Kirk and Kirk, 1971; Wagner, 1971). Johnson and Myklebust (1967) recommend teaching to the child's assets (e.g. visual perception, for example) while concomitantly giving remediation to his deficits (e.g. auditory perception).

PROCEDURE

Twelve youngsters, four of whom were girls and half of whom were Negroes, between the ages of four and six with the following qualifications were selected: (1) an intelligence quotient as measured by the Peabody Picture Vocabulary Test of 90 or above, (2) average or poor visual perception and (3) average or poor auditory perception. For the purpose of this study, visual perception was defined as that measured by the Frostig Developmental Test of Visual Perception (Frostig, et. al. 1963). This test includes five abilities which are considered important aspects of visual perception: (1) eye-motor coordination, (2) figure-ground perception, (3) form constancy,

(4) position in space, and (5) spatial relations. Each subtest presumably measures relatively independent visual perceptual abilities (Frostig and Horne, 1964; Cruickshank, et. al. 1961). A group of researchers (Boyd, et. al. 1970), however, factor analyzed the scale and concluded that the Frostig test measures essentially one general visual perceptual factor and the test should be used as a unitary measure of perceptual functioning. For the purpose of this study, auditory perception was defined as that measured by the average age norms of three subtests on the Illinois Test of Psycholinguistic Abilities, Revised Edition (Kirk, McCarthy, adn Kirk, 1968): (1) auditory sequencing, (2) auditory closure and, (3) sound blending. A number of studies indicate that disabled readers and nursery school children with auditory deficits obtained significantly lowered scores on one or a combination of these subtests (Kass, 1966; Hushoren, 1969).

Two groups of twelve children were organized by matching each member of the experimental group (Early Childhood Center, Drexel University) with an equivalent member of the control group (a model nursery school in the same community, operated by the School District of Philadelphia) in terms of the following factors: chronological age (within three months), intelligence quotient (within eight points), visual perceptual quotient (within four points), and auditory perception (within three months).

The experimental group (Group I) received an average of 13 hours of instructional time, over a seven month period. The control group received an average of 30 hours of instructional time consisting of a wide variety of "reading readiness" and "cognitive development" activities. In addition to formal instruction both groups followed a regular schedule of nursery school and/or kindergarten activities.

Approximately half of Group I's instructional time was spent with an Edison Responsive Environment Talking Typewriter. Graduate students, teachers, and supervisors pre-programmed each training session with materials and learning tasks which were individually tailored for each youngster. The material used developed out of the interests and experiences of the child. The machine, regarded here as a delivery system, was especially appealing since it could easily be programmed to emphasize visual or auditory perceptual modalities.

The treatment group was subdivided in half: Group Ia was composed of youngsters who obtained the lowest scores on the test of visual perception (Frostig), while Group Ib consisted of those children who obtained the lowest scores in auditory perception. The instructional procedures differed for each group. With Group Ia instruction began with a program to improve their visual deficits. There was a diagnostic profile or "learning print" for each child, together with an indication of what specific visual deficiency or cluster of deficiencies to remediate first. Some children, for example, began with programs to develop general form and configuration, such as matching pictures to outline drawings. Others were introduced to letter orientation or visual sequentialization. As time went by some eventually were introduced to programs for developing rate or speed of visual descrimination. The same format was followed with Group Ib except that their instructional procedures focused on auditory perceptual activities. Here some youngsters began with exercises to develop such comparatively simple abilities as reauditorizing words or imitating sound and rhythm patterns. Others were initiated into comparatively more difficult tasks such as blending syllables into words or utilizing visual symbols to improve auditory discrimination and analysis. The teachers, with guidance and assistance from supervisors and university staff, practiced

a circular relationship between evaluation and teaching: they utilized the child's response feedback to determine the next step. This frequently necessitated the observation of a child's responses to a series of situations and noting where he succeeded and where he failed.

The procedural strategy given up to this juncture, however, does not go far enough. The procedures enumerated thus far were designed to correct the child's deficits. But teaching to the deficits is a unitary, limited concept of instruction. Although a major purpose of this experiment was to raise the deficits it cannot be assumed that if an auditory ability is improved, e.g., sequentialization, that the child is capable of generalizing this facility to other areas of function. Then, too, many children cannot tolerate too much stimulation through their weakened modality. Indeed, teaching only to the child's deficit may insure that introduction to reading will need to be postponed until this deficit is remediated. For some youngsters this may have to wait until second or third grade. Thus, it is also necessary that teaching to a child's integrities be a significant aspect of the program. A child with visual deficits in perception, for example, will have difficulty retaining visual images for every word; he will need to acquire a systematic means of attacking unfamiliar words. If this youngster's auditory perception ability is well retained, he can be taught to attack unfamiliar words with phonetic and syllabication skills.

For these reasons one quarter of instructional time was spent in teaching to their perceptual integrities. For Group Ia, at least one of every four learning programs emphasized the development of their stronger auditory modality. For Group Ib, the opposite was the case. The object was to avoid what all experienced persons have seen, the child who has become "completely auditory" or "completely visual." Teaching just to the modality of strength

allows the child's integrity area to become unduly functional. He is no longer capable of intergrating certain classes of information, and interneurosensory learning processes may become permanently deficient.

RESULTS

Since the children had been paired off the desired statistic was found directly from the differences between pairs. The simplest approach was to treat the individual changes as if they were single measurements and then determine paired change values (Edward, 1954; Guilford, 1956). This procedure is strongly recommended whenever it can be conveniently applied (Guilford, 1956).

The data presented in Table I indicates the pre and post test means for each subgroup for I.Q., Frostig Perceptual Quotient and the combined mean age scores of the three auditory subtests from the Illinois Test of Psycholinguistic Abilities.

TABLE I

PRE AND POST TEST MEANS FOR EACH SUBGROUP FOR PEABODY PICTURE VOCABULARY QUOTIENT, FROSTIG PERCEPTUAL QUOTIENT, AND THE MEAN AGE SCORES (MONTHS) FROM THE THREE SUBTESTS OF THE ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES

| | GR. Ia | | GR. Ib | | GR. IIa | | GR. IIb | |
|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST |
| I.Q. | 98 | 101 | 98 | 100 | 98 | 100 | 97 | 99 |
| FROSTIG | 88 | 95 | 104 | 107 | 88 | 89 | 105 | 106 |
| ITPA (MONTHS) | 45 | 52 | 36 | 44 | 47 | 50 | 35 | 37 |

The Table reveals that the mean score of the Frostig test for Group Ia and

Group IIa were in the lowest quartile. At post testing Group Ia moved close to the fortieth percentile. The Frostig quotient for Group Ib and IIb were above the second quartile after pre and post testing, since this was the group with visual perception intact but with deficits in auditory perception. The mean age of all the children was forty four months. Table I also indicates that the age scores for the auditory perception tests was approximately eight and a half months below chronological age expectation for Groups Ib and IIb. At post testing Group Ib had gained an average of eight months (an expected increase since treatment time was eight months), but Group IIb only averaged a two month increase, from thirty five to thirty seven months.

Table II reveals that Group Ia made significantly greater improvement in the evaluation of visual perception (Frostig) while Group Ib did likewise in the evaluation of auditory perception (ITPA). Group Ia's improvement in auditory perception, although not significant, approached this criterion when compared to Group IIa. No significant differences were revealed between Group Ib and Group IIb on the Frostig evaluation.

The great difficulty of obtaining a sufficiently large number of children from the same socio-economic status and who had a large discrepancy between their Frostig scores and their ITPA scores, accounted for the comparatively small population sample. Nevertheless the data strongly suggests that best results were obtained with a corrective teaching approach when compared to typical early intervention instructional programs.

TABLE II

VALUES OF "t" FOR DIFFERENCES BETWEEN GROUPS RECEIVING A CORRECTIVE TEACHING PROGRAM IN AUDITORY AND VISUAL PERCEPTION AND GROUPS RECEIVING A TYPICAL EARLY INTERVENTION PROGRAM - ON FROSTIG DEVELOPMENTAL TEST OF VISUAL PERCEPTION AND THREE AUDITORY PERCEPTION TESTS OF THE ITPA

FROSTIG - GROUP Ia VS. GROUP IIa: t TEST $t = 7.2$, $p = < .01$

ITPA SUBTEST - GROUP Ib VS. GROUP IIB: t TEST $t = 6.5$, $p = < .01$

FROSTIG - GROUP Ib VS. GROUP IIb: t TEST $t = 2.1$, $p = > .05$

ITPA SUBTEST - GROUP Ia VS. GROUP IIa: t TEST $t = 2.1$, $p = > .05$

## DISCUSSION AND CONCLUSIONS

The findings of this study indicate that an early intervention instructional program which emphasizes differential diagnosis, development of a learning print for each child, followed by prescriptive procedures and techniques, is superior to the type of reading readiness instruction offered by a representative nursery school. Since both populations were receiving "readiness" programs in small group and one-to-one relations, it appears doubtful that the differing results were due to "Hawthorne effect."

Although every child that enters the Early Childhood Center receives a complete diagnostic workup, it generally does not pay, except for evaluative purposes, to place too heavy a premium on these scores. What is more important is a point of view and a degree of sophistication among the teachers that stresses the continued probing of the child's learning system as it operates in isolation and in combination during the total learning process. Careful scrutiny of his responses to the directed presentation

of stimuli to specific pathways will allow clinical inferences concerning the sources of operational strengths and weakness in the child. None of this denies that learning is basically an intergrative procedure with a heavy dependence upon the reciprocal functioning of the entire learning system. This is why astute teacher observation and sophistication, as to learning strategies, is so important. Clear discernment of the child's responses to the directed presentation of stimuli to specific pathways will allow clinical inferences as to the sources of operational strengths and weaknesses in the learner. Intervention can then be planned to teach the child by techniques to strengthen a system while simultaneously using another system to compensate for the weaknesses. It would thus appear efficacious to group children for reading readiness instruction according to their perceptual aptitudes.

Methods of teaching, which ignore the perceptual strengths or deficits of youngsters, or are translated into curriculum for all children (e.g. exclusive use of perceptual-motor training for all children in a certain age bracket), are likely to magnify the difficulty they encounter in attempting to develop reading skills. All of this is particularly important for educationally disadvantaged children. As Table I indicates, even those children (Gr. Ia and Gr. Ib) who made significant advances, still fell below the mean for their age group in both auditory and visual perception. The other groups (Gr. IIa and Gr. IIb) were already showing clear signs of perceptual stagnation.

Table I indicates that Gr. IIa and Gr. IIb maintained their developmental progress in auditory perception and visual perception, respectively. This would appear to indicate that if children have integritiy in a specific modality, they tend to retain it with moderate or such incidental stimulation

that occurred in their nursery school or kindergarten situation. This was not the case, however, with Gr. IIa and Gr. IIb in terms of progress in their deficient modality, visual perception and auditory perception respectively where there progress was minimal.

In conclusion, the study suggests that in at least one group of children with notable perceptual deficiences, the most vital step in remediation is the institution of corrective teaching procedures which takes into account each child's integrities and deficits to learning.

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